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EMBRYOLOGY.[1]

Optimum Temperature for Incubation.—M. Féré contributes to the *Journal de l'Anatomie* for July, 1894, the results of some experiments upon hen's eggs incubated at 34°–41°. These seem to have been made with caution and to warrant the author's conclusion that 38° is the temperature at which the smallest number of abnormal developments take place, at least during the first few days of incubation.

By exposing eggs to fumes of alcohol the author finds also that the injurious effects are overcome afterwards, in a larger percentage of cases, if the eggs are incubated at this optimum temperature, 38°, than at any other.

Cell Lineage.—Mr. A. D. Mead has made a comparative study of the cleavage in the polychætous annelids, Amphitrite, Lepidonotus, Clymenella and Scolecolepsis, along the lines marked out by E. B. Wilson in his noted paper upon Nereis. From the preliminary results,[2] those who are especially interested in this group may gather much of importance regarding the exact fate of cells of equal origin in the different species.

It will be of general interest to compare the results, when published in full, with those obtained upon Nereis, for in spite of the resemblances that are so close in this group there seem to be some marked differences, in the axial relations especially. We note that the median plane of Amphitrite corresponds to a plane bisecting two of the first four cells in place of passing between two cells, right and left, as in Nereis.

Fertilization in the Earthworm.[3]—A preliminary account of what promises to be a most valuable contribution is the result of the detailed study of the eggs of the striped earthworm, Allolobophora *fœtida*. The author, Katherine Foot, has studied the processes of maturation and fertilization in some two hundred eggs taken from the cocoons in which they are laid.

It seems that the sperm grows very rapidly just before the eggs are laid, so that one sperm may more than double its length within two hours. These sperms have a long head with a spine at its lip, a middle piece of some length and a long tail. They are found free in the cocoons for some ten minutes after laying and then penetrate the eggs. Several sperms may penetrate a single egg and all act alike in giving rise to peculiar conical areas of disturbance. These are more readily understood from the very interesting diagrammatic figures than from any verbal description. These figures seem to show much that the author does not emphasize regarding the minute protoplasmic phenomena concerned.

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[1] Edited by E. A. Andrews, Baltimore, Md., to whom abstracts, reviews and preliminary notes may be sent.

[2] Journal of Morphology, ix, Sept., 1894.

[3] Journal of Morphology, ix, Sept., 1894.

The egg gives off two polar bodies after the cocoon is deposited. The first divides into two ; the three thus formed subsequently break up into spherical bodies that lie irregularly between the egg and its membrane, as many as ten being found by the time the pronuclei are formed. The number of chromosomes is eleven, in the first maturation spindle, in the first polar body, in the second maturation spindle, in the second polar body, and in the egg after this has been constricted off.

The pronuclei are usually only two and do not present discovered differences.

It is claimed that the nuclei are seen distributed through the cytoplasm of the egg during the formation of the first maturation spindle.

The remarkable structures known as " polar rings " in the eggs of Clepsine are recognized again in this earthworm as peculiar and dissimilar appearances seen at opposite poles when the pronuclei are formed.

Cleavage in Batrachia—A study of the phenomena that actually take place in the cleavage of Amblystoma, Diemyctylus, *Rana palustris*, and *Bufo variabilis* has led Messrs. Jordan and Eycleshymer[4] to views that militate against much of the definiteness regarding the cleavage process that still remains in the text books.

They find that " each egg, as a rule, possesses an individual rhythm of cell-division and the time intervals between the different sets of furrows are substantially the same in the same egg. There is, however, considerable variation between these rhythms in different eggs."

Great variations occur in the way and in the relative time that cells divide, that cleavage planes appear, in fact, they state—" we have found irregularity to be the rule, regularity the exception."

No importance can be attached to any agreement between the first plane of cleavage and the median plane of the resulting embryo, since, owing to extensive torsions and cell shifting, material is brought from one side to the other.

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[4] Idem.

Again, from these studies it seems evident that in these Bratachia there is no such definite cell homology to be traced as in the Annelids.

The tendency of the paper is decidedly iconoclastic; what new generalizations may be built up from such data remains for the future to reveal.

Development of Sponges.—An important but much delayed paper by H. V. Wilson has at length been published.[5]

The author studied the marine sponges, Esperella, Tedania and other genera, in the Bahamas and on the New England coast.

The main body of this monograph of one hundred pages and twelve plates is an account of the formation and metamorphosis of the "gemmules" in the above named sponges.

These gemmules in Esperella are masses of cells that contain yolk and may appear anywhere in the mesoderm; they are formed by a collecting of cells to make a central mass or gemmule surrounded by a follicle. As the cells multiply other small gemmules may be added on to make a compound mass that ultimately undergoes a process of separation into the component cells. A free swimming larva is formed by this mass of cells that then escapes from the mother tissue. The outermost cells form an ectodermal layer that is ciliated except at the posterior pole where the cells are flattened and not pigmented as are the ciliated cells. The inner cells are connected by processes and form a parenchyma mass.

This active larva attaches itself obliquely by the posterior pole and undergoes a metamorphosis in which the ectoderm changes into a layer of simple flat cells and the loose cells of the mesodermal parenchyma arrange themselves about inter-cellular spaces, that at first are all alike, but subsequently become the various sponge cavities, subdermal spaces, afferent and efferent canals. These spaces are at first independent and only later become connected. The flaggellated chambers also arise independent of one another and of the other spaces and by a similar process of cell arrangement about intercellular spaces.

These remarkable gemmules closely resemble larvæ derived from eggs and have "germ" layers and the same specialization of the posterior end as is found in the egg larva. This noteworthy resemblance, the author thinks is due to inheritance from a common source and that thus the non-sexual gemmule has retained ancestral traits. No other such case is known, unless it be the anomalous mode of hydroid formation in *Epenthesis McCradyi* as described by W. K. Brooks.

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[5] Journal of Morphology, ix, Sept., 1894.

In an important discussion of the morphology of sponges, the author, basing his conceptions provisionally upon the generalizations of Haeckel and of Schultze, infers from the comparative anatomy of the group that there was a common ancestor, the Olynthus, which passed into the Sycon state by the outgrowth of radial tubes and this again into the Leucon by the growth of the radial tubes into flagellate chambers and by the growth of new entodermic diverticula. The non-calcareous have come from Leucon-like types. The afferent system of canals is ectodermic ; the efferent entodermic.

In the embryology, on the other hand, many abbreviations and other coenogenetic changes have obscured the record of the past. The entoderm and mesoderm must be regarded as not as yet sharply differentiated from one another.

Both sponges and coelenterates probably had a common *solid* ancestor, the Parenchymella. The blastopore cannot be regarded as an ancestral mouth and so its position is not of much weight in deciding how far the cavities of sponges and coelenterates are homologous.